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INTRODUCTION.

This REVIEW is based on reports for May, 1890, from 2,249 regular and voluntary observers. These reports are classified as follows: 166 reports from Signal Service stations; 126 reports from United States Army post surgeons; 5 reports of rainfall observations of the United States Geological Survey in New Mexico; 1,395 monthly reports from state weather service and voluntary observers; 26 reports from Canadian stations; 174 reports through the Central Pacific Railway Company; 357 marine reports through the co-operation of the Hydrographic Office, Navy Department; marine reports through the "New York Herald Weather Service;" monthly weather reports from the local weather services of Alabama, Arkansas, Colorado, Illinois, Indiana, The Iowa Weather and Crop Service, Kansas, Kentucky, Louisiana, Michigan, Minnesota, Mississippi, Missouri, Meteorological Report of the Missouri State Board of Agriculture, Nebraska, Nevada, New England, New Jersey, New York, North Carolina, North and South Dakota, Ohio, Oregon, Pennsylvania, South Carolina, Tennessee, and Texas, and international simultaneous observations. Trustworthy newspaper extracts and special reports have also been used.

CHARACTERISTICS OF THE WEATHER FOR MAY, 1890.

The flood along the lower Mississippi river subsided gradually, and much land in the river parishes of Louisiana which was inundated on the 1st was under cultivation at the close of the month. A rise in the Red River caused the overflow of a considerable extent of country in northwestern Louisiana and southwestern Arkansas in the early part of the month. There was a marked rise in the Arkansas River at Fort Smith, Ark., on the 20th and 21st, and at Little Rock, Ark., from the 23d to 25th. At the close of the month the Mississippi River was 0.4 foot above the danger-line at Vicksburg, Miss., and 0.8 foot above the danger-line at New Orleans, La.; most of the country from Bayou Sara to the mouth of the Red River, Pointe Coupee Parish, La., was under water; from the mouth of the Red River to within twelve miles of Monroe, Ouachita Parish, La., a distance of over two hundred miles, the country had been inundated for nearly three months; and from the Red River up the Black River for a distance of eighty miles much of the land was under water. Damaging floods were reported in Ontario, Canada, on the 5th; along the Brazos River, Texas, on the 6th; in the vicinity of Camp Peña Colorado, Tex., on the 15th; in central New York and northeastern Pennsylvania about the 20th; along the Willamette River, Oregon, from the 10th to 20th; along the upper Potomac river about the 26th; in the Island of Cuba about the 29th; and in Fresno and Tulare counties, California, at the close of the month. Floods were also reported along the Carson River, Nevada, and in Scott county, Iowa.

The month was cooler than usual in the central valleys, the Lake region, the Gulf States, and over the eastern part of the country, save at Atlantic coast stations north of the thirty-third parallel. In the plateau regions and adjoining parts of the eastern slope of the Rocky Mountains, and on the Pacific coast north of the thirty-fifth parallel the month was warmer than the average May. The greatest departures below the average temperature occurred in the north-central part of the country, where they exceeded 6°, and the greatest departures above the average temperature occurred at stations in the middle and southern plateau regions, where they were more than 3°. At Keeler, Cal., Winnemucca, Nev., and Albany, Oregon, the mean temperature was higher, and at Marquette, Mich., and Saint Vincent, Minn., it was lower than previously reported for May. The highest maximum temperature reported was 108°, at Florence and Fort McDowell, Ariz.; and at Springfield, Ill., Rapid City, S. Dak., Colorado Springs, Colo., and Fort Stanton, N. Mex., the maximum temperature was the highest ever reported for May. The lowest minimum temperature reported was 5°, at Fort D. A. Russell, Wyo., and the temperature fell to 11° at Breckenridge, Colo. At Atlanta, Ga., Chattanooga and Nashville, Tenn., Sandusky, Ohio, Grand Haven, Mich., Moorhead, Minn., La Crosse, Wis., Colorado Springs, Colo., and Concordia, Kans., the minimum temperature was as low or lower than previously reported for May. Killing frost occurred in South Dakota on the 1st, in upper Michigan on the 3d and 11th, in Ohio on the 2d, 7th, 8th, and 11th, in Nebraska on the 4th and 5th, in northeastern Iowa on the 6th, in Missouri on the 5th, 6th, and 7th, in Kansas on the 7th, in northern Alabama on the 8th, in New Jersey on the 9th, in lower Michigan on the 11th, in North Dakota on the 12th and 15th, in Missouri on the 14th and 16th, in Indian Territory and Kansas on the 16th, and in Oregon on the 21st, 28th, 29th, and 30th. In Ohio killing frost was about three weeks later, in Iowa about one week later, in Alabama about seven weeks later, in New Jersey three to four weeks later, in lower Michigan about two weeks later, in North Dakota seasonable, in Missouri and Indian Territory about one month later, in Kansas about three weeks later, and in Oregon about two weeks later than the average date of last killing frost in the respective states.

The heaviest precipitation occurred on the east-central coast of Florida, where it exceeded fifteen inches, and monthly precipitation exceeding ten inches was reported in central Texas, east-central and northwestern Pennsylvania, central and southeastern Louisiana, northwestern South Carolina, central Alabama, central Georgia, south-central Indiana, and central and south-central Maine. Over a greater part of Arizona, and in southeastern California, southern Nevada, southwestern Colorado, eastern Utah, southwestern New Mexico, and in extreme western Texas no precipitation was reported. The precipita-

tion was generally in excess of the average for the month east of the Mississippi River, and from the middle Pacific coast northeastward over the northern plateau region and a part of the northeastern slope of the Rocky Mountains; in the interior and southwestern parts of the country it was deficient. The greatest departures above the average precipitation occurred from central Alabama southeastward over northeastern Florida, where they exceeded six inches, and the most marked deficiencies were noted from central Wyoming eastward to north-central Nebraska, and in the Panhandle of Texas, where they exceeded three inches. On the middle Pacific coast the monthly precipitation was over two and one-half times greater, in the lower lake region and over the northern plateau region more than one-half greater, and in the east Gulf, south Atlantic, and middle Atlantic states, and New England about one-third greater than the average precipitation for May. In the southern plateau region it amounted to about 5 per cent., on the south Pacific coast to about 15 per cent., and on the northeastern and middle-eastern slopes of the Rocky Mountains, the north Pacific coast, and in the extreme northwest to less than 50 per cent. of the usual amount. At Albany, N. Y., Atlantic City, N. J., Jacksonville and Merritt's Island, Fla., Erie, Pa., Forsyth, Ga., Cumberland, Md., Newburyport and Somerset, Mass., Thoruville, Mich., Cooperstown, N. Y., Dyberry, Pa., and Strafford, Vt., the precipitation was the heaviest, and at Moorhead, Minn., Fort Yates, S. Dak., Fort Washakie, Wyo., Concordia, Kans., Fort Stanton, N. Mex., in Arizona, and at Eola, Oregon, it was the least ever reported for May.

For the period January to May, 1890, inclusive, the precipitation in the Ohio Valley and Tennessee, the lower lake region, over the southeastern slope of the Rocky Mountains, and on the middle Pacific coast was more than one-fourth greater than the average, while in the south Atlantic and east Gulf states, the extreme northwest, the Missouri Valley, the northeastern and middle-eastern slopes of the Rocky Mountains, and on the south Pacific coast it was two-fourths to three-fourths of the average for the period named.

Severe electrical and wind storms were extensively and frequently reported in states lying east of the Rocky Mountains, and well-defined tornadoes were noted in McCulloch county, Tex., on the 1st, in Union, Harrison, and Summit counties, Ohio, on the 10th, and in Gratiot county, Mich., on the 24th, the tornado which passed over Akron, Summit Co., Ohio, on the 10th being an especially noteworthy and clearly-described storm. A remarkable aerolite passed in a northeasterly direction over the northwestern counties of Iowa at about 5.15 p. m. of the 2d, and was observed as far north as southern South Dakota and Minnesota. The meteor exploded with a heavy report before reaching the ground, and fragments were scattered over an area of several square miles in the southwestern part of Winnebago county, Iowa, the largest fragment discovered weighing about seventy pounds.

ATMOSPHERIC PRESSURE (expressed in inches and hundredths).

The distribution of mean atmospheric pressure for May, 1890, as determined from observations taken daily at 8 a. m. and 8. p. m. (75th meridian time), is shown on chart ii by isobars. The departure of the mean pressure for May, 1890, obtained from observations taken twice daily at the hours named from that determined from hourly observations, varied at the stations named below, as follows:

Station.	Departure.	Station.	Departure.
Eastport, Me	+.009	Saint Paul, Minn	+.002
Boston, Mass	+.013	Savannah, Ga	.000
New York City	+.013	Saint Louis, Mo	—.003
Philadelphia, Pa	+.008	Galveston, Tex	—.007
Washington City	+.003	Fort Assinniboine, Mont	—.002
Buffalo, N. Y	+.004	Santa Fé, N. Mex	—.012
Detroit, Mich	+.007	Denver, Colo	—.001
Cincinnati, Ohio	+.001	Salt Lake City, Utah	—.005
Memphis, Tenn	+.004	Portland, Oregon	—.016
Chicago, Ill	+.001	San Francisco, Cal	—.014
New Orleans, La	+.003	San Diego, Cal	—.016

For May, 1890, the mean pressure was highest over the south Atlantic states and along the north Pacific coast, where it was above 30.00, the highest mean reading, 30.05, being noted at Roseburgh, Oregon. The mean pressure was lowest over the western and southeastern parts of the southern plateau region, where it fell below 29.80, the lowest mean reading, 29.78, being noted at El Paso, Tex. Over the north-central part of the country, from the Rocky Mountains to the upper lake region, the mean pressure varied from 29.85 to 29.90.

A comparison of the pressure chart for May, 1890, with that of the preceding month shows a general decrease in pressure, save over eastern Nova Scotia and Cape Breton Island, where the mean pressure was slightly higher than for April. The most marked decrease in pressure occurred over the upper lake region, where it was more than .20, and the decrease exceeded .10, save over the eastern part of New England, and at stations on the Pacific coast and in the adjoining part of the plateau region. There was a decrease of about .10 within the area of low pressure over the southern plateau region; a decrease of about .15 in the area of high pressure over the south Atlantic states; and a decrease of .05 to .10 in the area of high pressure over the north Pacific coast.

The mean pressure was below the normal, except over the extreme eastern part of New England, over the Canadian Maritime Provinces, over extreme southern Florida, and from the northeastern slope of the Rocky Mountains southwestward to the south Pacific coast. The most marked departures below the normal pressure occurred from the Red River of the North Valley eastward over the upper lake region and southeastward to northern Virginia, and within a small area extending from east-central Texas over northern Louisiana, where they exceeded .05. In sections where the mean pressure was above the normal the departures were less than .05.

BAROMETRIC RANGES.

The monthly barometric ranges at the several Signal Service stations are shown in the table of miscellaneous meteorological data. The general rule, to which the monthly barometric ranges over the United States are found to conform, is that they increase with the latitude and decrease slightly, though somewhat irregularly, with increasing longitude. In May, 1890, the monthly ranges were greatest in extreme northwestern North Dakota, where they exceeded 1.10, whence they decreased south of east to less than .70 on the coast of southeastern New England, southeastward to less than .40 over extreme southern Florida, southward to less than .50 on the Gulf coast, and southwestward to .30 in southeastern Arizona and on the extreme south Pacific coast, and westward to less than .90 on the Pacific coast north of the Columbia River. Along the Atlantic coast the monthly ranges varied from .39 at Key West, Fla., to .77 at Portland and Eastport, Me.; between the eighty-second and ninety-second meridians, .48 at Tampa, Fla., to .91 at Marquette, Mich.; between the Mississippi River and the Rocky Mountains, .44 at Corpus Christi and Palestine, Tex., to 1.12 at Fort Buford, N. Dak.; in the Rocky Mountain and plateau regions, .30 at Fort Grant, Ariz., to .89 at Rapid City, S. Dak., and .88 at Fort Assinniboine, Mont., and Walla Walla, Wash.; on the Pacific coast, .30 at San Diego, Cal., to .86 at Olympia, Wash.

Chart ii shows that in May, 1890, there was a range in mean pressure of .14 from the east coast of Florida to the north shore of Lake Superior and the upper Missouri valley; a range of .16 from the upper Missouri valley to the north Pacific coast; and a range of .22 from the southern part of the southern plateau region to the extreme south Pacific coast.